


7.1/7  $y=x^2$   $y=\sqrt{x}$   $x=\frac{1}{4}$   $x=1$



$$A = \int_{\frac{1}{4}}^1 \sqrt{x} - x^2 dx$$

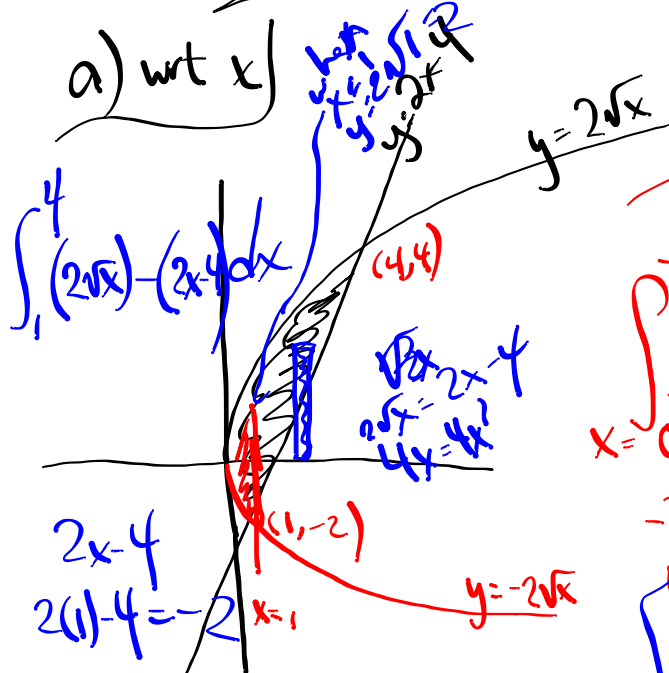
$$\left( \frac{2x^{3/2}}{3} - \frac{x^3}{3} \right) \Big|_{\frac{1}{4}}^1 = \left( \frac{2}{3} - \frac{1}{3} \right) - \left( \frac{2}{3} \left( \frac{1}{8} \right) - \frac{1}{3} \left( \frac{1}{64} \right) \right)$$

$$= \frac{1}{3} - \frac{1}{3} \left( \frac{16}{64} - \frac{1}{64} \right) = \frac{1}{3} - \frac{5}{64}$$

$$= \frac{64-15}{192} = \frac{49}{192}$$

7.1/6 Find the area between  $y^2 = 4x$  and  $y = 2x - 4$

a) wrt x



$$\int_1^4 (2\sqrt{x} - (2x - 4)) dx$$

$$2x - 4$$

$$2(1) - 4 = -2$$

$$\int_0^1 (2\sqrt{x} - (-2\sqrt{x})) dx$$

$$\int_0^1 4\sqrt{x} dx$$



$\int$  wrt x

$$\int_0^1 (2\sqrt{x} - (-2\sqrt{x})) dx + \int_1^4 (2\sqrt{x} - (2x - 4)) dx$$

$$-2\sqrt{x} = 2x - 4$$

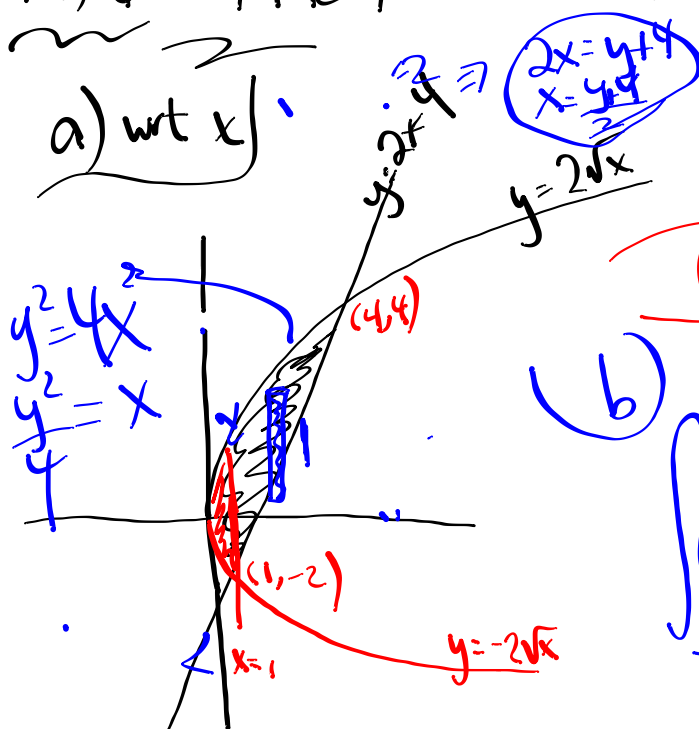
$$4x = 4x^2 - 16x + 16$$

$$0 = 4x^2 - 20x + 16 = 4(x^2 - 5x + 4)$$

$$= 4(x - 4)(x - 1)$$

7.1/6 Find the area between  $y^2 = 4x$  and  $y = 2x - 4$

a) wrt x



$$y^2 = 4x$$

$$y = \sqrt{4x}$$

$$y = 2\sqrt{x}$$

b) wrt y

$$\int_{-2}^4 \left( \frac{y+4}{2} - \left( \frac{y^2}{4} \right) \right) dy$$

$$= \frac{1}{4} \int_{-2}^4 (2y + 8 - y^2) dy$$

$$= \frac{1}{4} \left( y^2 + 8y - \frac{y^3}{3} \right) \Big|_{-2}^4$$

$$= \frac{1}{4} \left[ \left( 16 + 32 - \frac{64}{3} \right) - \left( 4 - 16 + \frac{8}{3} \right) \right]$$

$$= \frac{1}{4} \left[ 60 - \frac{72}{3} \right] = \frac{1}{4} (36) = 9$$

